

On page 3, line 26, after "increased" insert --by using a very small diameter laser beam--.

On page 3, line 33, after "N", insert --different--.

On page 3, line 34, change "images" to --views--.

On page 3, line 35, after "N", insert --different--.

On page 3, line 36, change "images" to --views--.

On page 3, line 36, delete --pattern unit--.

On page 3, line 38, change "pattern unit" to --surface of the article--.

In the Claims:

Please cancel claim 1 without prejudice.

Please add new claims 96-121 as follows:

- 1 ~~96.~~ An inspection device for inspecting a patterned substrate, comprising:
- 2 a light source providing a light beam;
- 3 an optical system for directing the beam to impinge upon a defined spot on
- 4 the substrate;
- 5 a plurality of detectors spaced apart from each other but concurrently
- 6 directed at the defined spot, said plurality of detectors providing a first
- 7 and a second reflection data streams corresponding to reflected light
- 8 from the spot to first and second directions;
- 9 a memory having a first and a second reference data streams;



10 a comparator comparing said first reflection data stream to said first reference  
11 data stream and providing a first comparison signal, and comparing  
12 said second reflection data stream to said second reference data stream  
13 and providing a second comparison signal.

2 97. The inspection device of claim 96, further comprising a decision  
1 processor receiving said first and second comparison signals and providing a global  
2 defect alarm.

3 98. The inspection device of claim 96, further comprising:  
1 a pixel characterizer receiving said first and second reflection data streams  
2 and assigning a corresponding pixel type to each inspected pixel of  
3 said first and second reflection data streams, each pixel type having a  
4 threshold associated therewith;  
5  
6 a subtractor receiving the first and second reflection data streams and the first  
7 and second reference data streams and calculating a difference value  
8 for each inspected pixel of said first and second reflection data streams;  
9 and

10 wherein for each inspected pixel in said first and second reflection data  
11 stream said comparator compares the difference value to the threshold  
12 associate with the pixel type assigned to said pixel, and issues a defect  
13 alarm when the difference value exceeds the threshold.

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99. The inspection device of claim 3, wherein said difference value  
comprises a difference between energy level of said inspected pixel and an average  
energy level of a plurality of pixels selected from one of said first and second  
reference data streams.

5  
100. The inspection device of claim 3, wherein said difference value  
comprises a difference between a first average energy level of said inspected pixel  
and selected pixels in close proximity to said inspected pixel, and a second average  
energy level of a plurality of pixels selected from one of said first and second  
reference data streams.

6  
101. A semiconductor wafer inspection system having an adaptive  
threshold setting capabilities, comprising:  
a detector providing a signal of a plurality of inspected pixels;  
a pixel characterizer receiving said signal and associating with each inspected  
pixel an inspected pixel type depending on the intensity of the  
inspected pixel;  
a comparator receiving the signal of each of said inspected pixels and the  
associated inspected pixel type and determining therefrom a  
corresponding threshold, said comparator further performing a  
threshold-based comparison operation between each of the inspected  
pixels and a reference data.

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1 ~~102.~~ The inspection system of claim ~~101~~<sup>6</sup>, wherein said comparator further  
2 comprises:  
3 an average circuit providing an average intensity of said reference data;  
4 a subtractor providing an intensity difference between the intensity of the  
5 inspected pixel and the average intensity of the reference data; and  
6 wherein said threshold-based comparison operation comprises comparing the  
7 intensity difference to the corresponding threshold.

8  
1 ~~103.~~ A method of inspecting a patterned semiconductor wafer, comprising  
2 the steps of:  
3 illuminating a defined spot on the wafer with a light beam;  
4 obtaining a first pixel data from a light reflected from the spot to a first  
5 direction;  
6 obtaining a second pixel data from a light reflected from the spot to a second  
7 direction different from the first direction;  
8 obtaining a first reference pixel data from a memory and comparing said first  
9 pixel data to said first reference pixel data to determine whether said  
10 first pixel data points to a presence of a defect on the spot;  
11 obtaining a second reference pixel data from the memory and comparing said  
12 second pixel data to said second reference pixel data to determine  
13 whether said second pixel data points to a presence of a defect on the  
14 spot.

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1 ~~104.~~ A method of inspecting a patterned semiconductor wafer, comprising  
2 the steps of:  
3 illuminating a defined spot on the wafer with a light beam;  
4 obtaining an inspected pixel of the spot;  
5 inspecting the characteristics of the inspected pixel and assigning a pixel type  
6 to the inspected pixel, corresponding to the characteristics of the  
7 inspected pixel data;  
8 obtaining a reference data from a memory and comparing the inspected pixel  
9 to said reference data in correlation to the assigned pixel type to  
10 determine whether the inspected pixel points to a presence of a defect  
11 on the spot.

10

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1 ~~105.~~ The method of claim ~~104~~, further comprising the steps of;  
2 providing a threshold level corresponding to the assigned pixel type;  
3 obtaining a difference value between the inspected pixel and the reference  
4 data; and  
5 comparing the difference value to said threshold level to determine whether  
6 the inspected pixel points to a presence of a defect on the spot.

11

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1 ~~106.~~ The method of claim ~~105~~, wherein said reference data comprises an  
2 average energy of a reference pixel corresponding to the inspected pixel, and energy  
3 of reference neighboring pixels situated in close proximity to said reference pixel.

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1 ~~107~~. A method of inspecting a patterned semiconductor wafer, comprising  
2 the steps of:  
3 illuminating a defined spot on the wafer with a light beam;  
4 obtaining an inspected pixel and inspected neighborhood pixels neighboring  
5 said inspected pixel;  
6 inspecting the characteristics of the inspected pixel and assigning a pixel type  
7 to the inspected pixel;  
8 obtaining a reference data and a reference data type from a memory and  
9 comparing the inspected pixel to said reference data in correlation to  
10 the assigned pixel type and reference data type to determine whether  
11 the inspected pixel points to a presence of a defect on the spot.

13  
1 ~~108~~. The method of claim ~~107~~<sup>12</sup>, further comprising the steps of:  
2 comparing the energy level of the inspected pixel to the energy level of the  
3 inspected neighborhood pixels to determine whether a large variation  
4 in energy exists;  
5 when a large variation in energy exists, obtaining a convoluted energy of the  
6 inspected pixel and the neighborhood inspected pixels, and comparing  
7 the convoluted energy to the reference data in correlation to the  
8 assigned pixel type and reference data type to determine whether the  
9 inspected pixel points to a presence of a defect on the spot.

14  
1 ~~109~~. A method for inspecting a substrate to determine whether the  
2 substrate includes a defect, comprising:

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3 providing first and second inspection data streams that correspond to  
4 different perspectives of a single specified location on the substrate;  
5 providing first and second reference data streams that respectively correspond  
6 to the first and second inspection data streams; and  
7 comparing the first inspection data stream to the first reference data stream  
8 and the second inspection data stream to the second reference data  
9 stream.

1 <sup>15</sup>~~110~~. The method of claim <sup>14</sup>~~109~~, wherein said comparing step comprises:  
2 assigning a pixel type to each pixel in the first and second inspection data  
3 streams;  
4 comparing each inspected pixel to a corresponding reference pixel, selected  
5 from one of said first and second reference data streams, using  
6 threshold values that vary depending upon the assigned pixel type.

1 <sup>16</sup>~~111~~. A semiconductor wafer inspection system having an adaptive  
2 threshold setting capabilities, comprising:  
3 a detector providing a signal of a plurality of inspected pixels;  
4 a pixel characterizer receiving said signal and associating with each inspected  
5 pixel an inspected pixel type depending on the intensity of the  
6 inspected pixel and the intensity of pixels neighboring said inspected  
7 pixel;  
8 a comparator receiving the signal of each of said inspected pixels and the  
9 associated inspected pixel type and determining therefrom a







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4 providing first and second dark field information streams that respectively  
5 correspond to a different dark field perspective for each location in the  
6 series;  
7 providing first and second reference information streams that correspond to  
8 the first and second dark field information streams;  
9 comparing the first dark field information stream to the first reference  
10 information stream to provide a first comparison signal and the second  
11 dark field information stream to the second reference information  
12 stream to provide a second comparison signal;  
13 providing a bright field information stream that corresponds to each location  
14 in the series; and  
15 using the first and second comparison signals and the brightfield information  
16 stream to determine whether the article includes a defect.

1 <sup>19</sup>~~114~~. The method of claim <sup>18</sup>~~113~~, wherein at least one threshold for providing  
2 the first and second comparison signals is dynamically adjusted based upon a pixel  
3 type that is assigned to pixels in the first and second dark field information streams.

1 <sup>20</sup>~~115~~. The method of claim <sup>19</sup>~~114~~, wherein the intensity of each pixel relative to  
2 neighboring pixels is used to assign the pixel type.

1 <sup>21</sup>~~116~~. An apparatus for inspecting an article for defects comprising:  
2 an optical system, which illuminates a series of locations on the article with  
3 both dark field and bright field illumination;

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4 an array of detectors, which provides first and second dark field information  
5 streams that respectively correspond to a different dark field  
6 perspective for each location in the series;  
7 a memory, which provides first and second reference information streams  
8 that correspond to the first and second dark field information streams;  
9 a comparator, which compares the first dark field information stream to the  
10 first reference information stream to provide a first comparison signal  
11 and the second dark field information stream to the second reference  
12 information stream to provide a second comparison signal;  
13 a bright field detector, which provides a bright field information stream that  
14 corresponds to each location in the series; and  
15 a decision processor, which uses the first and second comparison signals and  
16 the brightfield information stream to determine whether the article includes a defect.

1 <sup>22</sup>~~117~~. The apparatus of claim <sup>21</sup>~~116~~, wherein at least one threshold for  
2 providing the first and second comparison signals is dynamically adjusted based  
3 upon a pixel type that is assigned to pixels in the first and second dark field  
4 information streams.

1 <sup>23</sup>~~118~~. The apparatus of claim <sup>22</sup>~~117~~, wherein the intensity of each pixel relative  
2 to neighboring pixels is used to assign the pixel type.

1 <sup>24</sup>~~119~~. A method for determining whether an article includes a defect, the  
2 method comprising:

3 illuminating a series of locations on the article;  
4 providing an inspection information stream using light reflected from the  
5 article as a result of the illuminating step;  
6 providing a reference information stream; and  
7 detecting a defect in the article by:  
8 determining whether the difference between data in the inspection  
9 information stream and data in the reference information  
10 stream exceeds a threshold level; and  
11 dynamically adjusting the threshold level so that different threshold  
12 levels are provided for different locations in the series of  
13 locations on the article.

1 <sup>25</sup>  
~~120.~~ The method of claim <sup>24</sup>~~119~~, wherein the step of dynamically adjusting  
2 the threshold level incorporates a determination of the intensity of pixels in the  
3 inspection information stream that correspond to the different locations on the  
4 article.

1 <sup>26</sup>  
~~121.~~ The method of claim <sup>25</sup>~~120~~, wherein the intensity of each pixel relative to  
2 neighboring pixels is used to assign the pixel type.

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